Appendix I

MURPHY RANCH
DRAFT NOISE ASSESSMENT
MILPITAS, CALIFORNIA

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Introduction

This report presents the results of the noise assessment conducted for the Murphy Ranch project proposed in Milpitas, California. The project proposes a General Plan Amendment and the development of multi-family housing on the site. This assessment presents the fundamentals of environmental noise, provides a discussion of policies and standards applicable to the project, presents the results of measurements conducted at the site, and evaluates of the potential significance of impacts resulting from the project.

Fundamentals of Environmental Noise

Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB) with 0 dB corresponding roughly to the threshold of hearing. Decibels and other technical terms are defined in Table 1.

Most of the sounds which we hear in the environment do not consist of a single frequency, but rather a broad band of frequencies, with each frequency differing in sound level. The intensities of each frequency add together to generate a sound. The method commonly used to quantify environmental sounds consists of evaluating all of the frequencies of a sound in accordance with a weighting that reflects the facts that human hearing is less sensitive at low frequencies and extreme high frequencies than in the frequency mid-range. This is called "A" weighting, and the decibel level so measured is called the A-weighted sound level (dBA). In practice, the level of a sound source is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve. Typical A-weighted levels measured in the environment and in industry are shown in Table 2 for different types of noise.

Although the A-weighted noise level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of noise from distant sources which create a relatively steady background noise in which no particular source is identifiable. To describe the time-varying character of environmental noise, the statistical noise descriptors, L_{01}, L_{10}, L_{50}, and L_{90}, are commonly used. They are the A-weighted noise levels equaled or exceeded during 1%, 10%, 50%, and 90% of a stated time period. A single number descriptor called the L_{eq} is also widely used. The L_{eq} is the average A-weighted noise level during a stated period of time.

In determining the daily level of environmental noise, it is important to account for the difference in response of people to daytime and nighttime noises. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noise becomes very noticeable. Further, most people sleep at night and are very sensitive to noise intrusion. To account for human sensitivity to nighttime noise levels, a descriptor, DNL (day/night average sound level), was developed. The DNL divides the 24-hour day into the daytime of 7:00 AM to 10:00 PM and the nighttime of 10:00 PM to 7:00 AM. The nighttime noise level is weighted 10 dB higher than the daytime noise level. The Community Noise Equivalent Level (CNEL) is another 24-hour average which includes both an evening and nighttime weighting.

Table 1: Definitions of Acoustical Terms Used in this Report

Term	Definitions
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, Leq	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Table 2: Typical Noise Levels in the Environment

Common Outdoor Noise Source	Noise Level (dBA)	Common Indoor Noise Source
	120 dBA	
Jet fly-over at 300 meters		Rock concert
	110 dBA	
Pile driver at 20 meters	100 dBA	
		Night club with live music
	90 dBA	
Large truck pass by at 15 meters		
	80 dBA	Noisy restaurant
		Garbage disposal at 1 meter
Gas lawn mower at 30 meters	70 dBA	Vacuum cleaner at 3 meters
Commercial/Urban area daytime		Normal speech at 1 meter
Suburban expressway at 90 meters	60 dBA	
Suburban daytime		Active office environment
	50 dBA	
Urban area nighttime		Quiet office environment
	40 dBA	
Suburban nighttime		
Quiet rural areas	30 dBA	Library
		Quiet bedroom at night
Wilderness area	20 dBA	
Most quiet remote areas	10 dBA	Quiet recording studio
Threshold of human hearing	0 dBA	Threshold of human hearing

Regulatory Background

State CEQA Guidelines
There are no state laws directly applicable in the assessment of noise associated with new projects. The California Environmental Quality Act (CEQA) includes qualitative guidelines for determining significance of adverse environmental noise impacts. A project will typically have a significant impact if it would;

a. Expose people to or generate noise levels in excess of standards established in the local general plan, noise ordinance, or applicable standards of other agencies.

b. Expose people to or generate excessive groundborne vibration or groundborne noise levels.

c. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

d. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

e. For projects within an area covered by an airport land use plan or within two miles of a public airport or public use airport when such an airport land use plan has not been adopted, or within the vicinity of a private airstrip, expose people residing or working in the project area to excessive aircraft noise levels.

f. For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

CEQA does not define the noise level increase that is considered substantial. Typically, an increase in the day-night average noise level of 3 dBA DNL or greater at noise-sensitive receptors would be considered significant when projected noise levels would exceed those considered satisfactory for the affected land use.

Checklist items (a), (c), and (d) are relevant to the proposed project. Ground-borne noise and vibration is not anticipated to occur as a result of the project. The project is not located in the vicinity of a private airstrip or public airport. Checklist items (b), (e), and (f) are not carried forward for further analysis.

California Building Code
Environmental noise intrusion into new multi-family housing is regulated by Appendix Chapter 12, Section 1208, Sound Transmission Control in the 2001 California Building Code. Interior noise levels attributable to exterior sources shall not exceed 45 dBA DNL in any habitable room. Multi-family residential proposed in noise environments exceeding 60 dBA DNL require an acoustical analysis showing that the proposed design will limit exterior noise to the prescribed allowable interior level.

City of Milpitas General Plan
The Noise Element of the City of Milpitas General Plan includes policy statements to guide public and private planning to attain and maintain acceptable noise levels. The following policies would be applicable to the project:

6-I-1 Use the guidelines in Table 6-1 (Noise and Land Use Compatibility-Not Shown) as review criteria for development projects.

The Noise and Land Use Compatibility Table indicates that multifamily residential land uses are considered "normally acceptable" up to 65 dBA DNL "conditionally acceptable" between 60 and 70 dBA DNL, "normally unacceptable" between 70 and 75 dBA DNL, and "clearly unacceptable" in environments that exceed 75 dBA DNL.

6-I-2 Require an acoustical analysis for projects located within a "conditionally acceptable" or "normally unacceptable" exterior noise exposure area. Require mitigation measures to reduce noise to acceptable levels.

6-I-3 Prohibit new construction where the exterior noise exposure is considered "clearly unacceptable" for the use proposed.

6-I-4 Where actual or projected rear yard and exterior common open space noise exposure exceeds the "normally acceptable" levels for new single-family and multifamily residential projects, use mitigation measures to reduce sound levels in those areas to acceptable levels.

6-I-5 All new residential development (single family and multifamily) and lodging facilities must have interior noise levels of 45 dBA DNL or less. Mechanical ventilation will be required where use of windows for ventilation will result in higher than 45 dBA DNL interior noise levels.

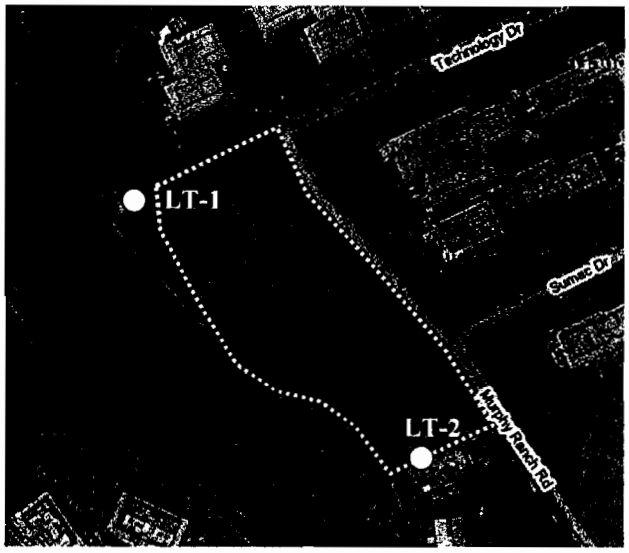
6-I-7 Avoid residential DNL exposure increases of more than 3 dB or more than 65 dB at the property line, whichever is more restrictive.

6-I-13 Restrict the hours of operation, technique, and equipment used in all public and private construction activities to minimize noise impact. Include noise specifications in requests for bids and equipment information.

Existing Noise Environment

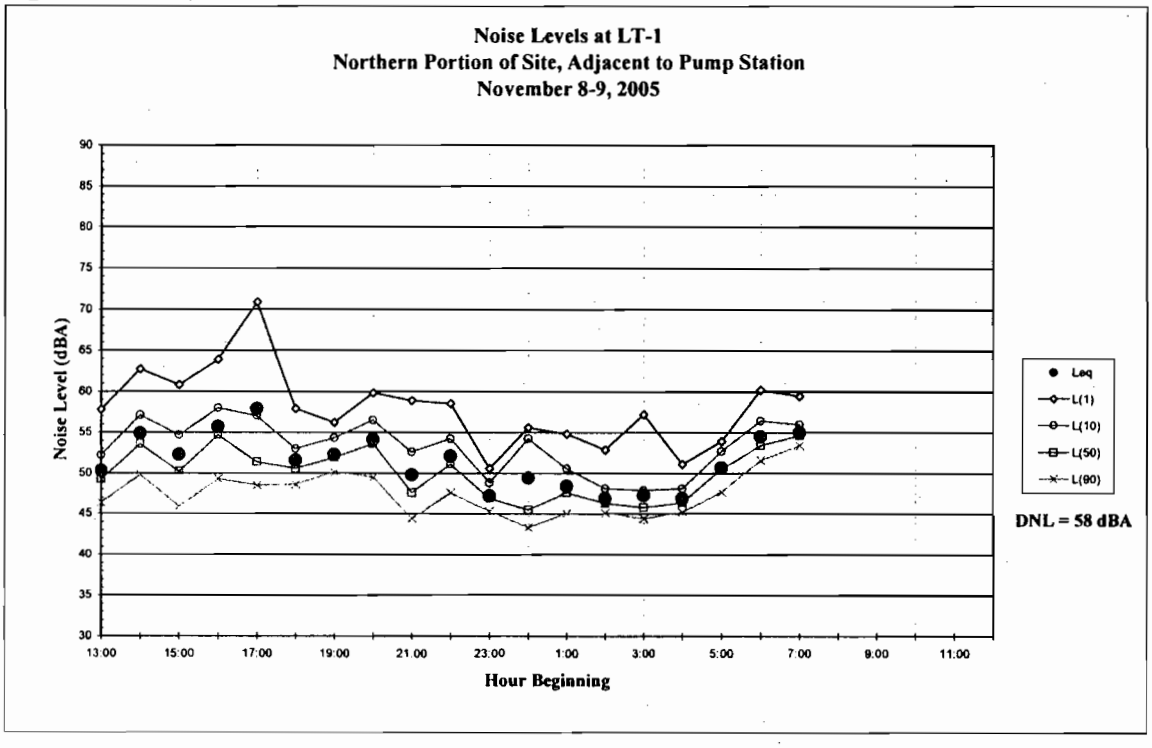
The project site is located along Murphy Ranch Road between Technology Drive and Sumac Drive in Milpitas, California and is bounded by Coyote Creek to the west and office and industrial park uses to the north, south, and east. The existing noise environment results primarily from local traffic, aircraft operations, and intermittent noise generated by the adjacent pump stations located south of and at the northwest corner of the site. A noise monitoring survey documented existing noise conditions from November 8th to 11th, 2005. Two long-term noise measurements were made at representative locations to complete the noise monitoring survey. Noise measurement locations are shown on Figure 1.

Figure 1: Noise Measurement Locations



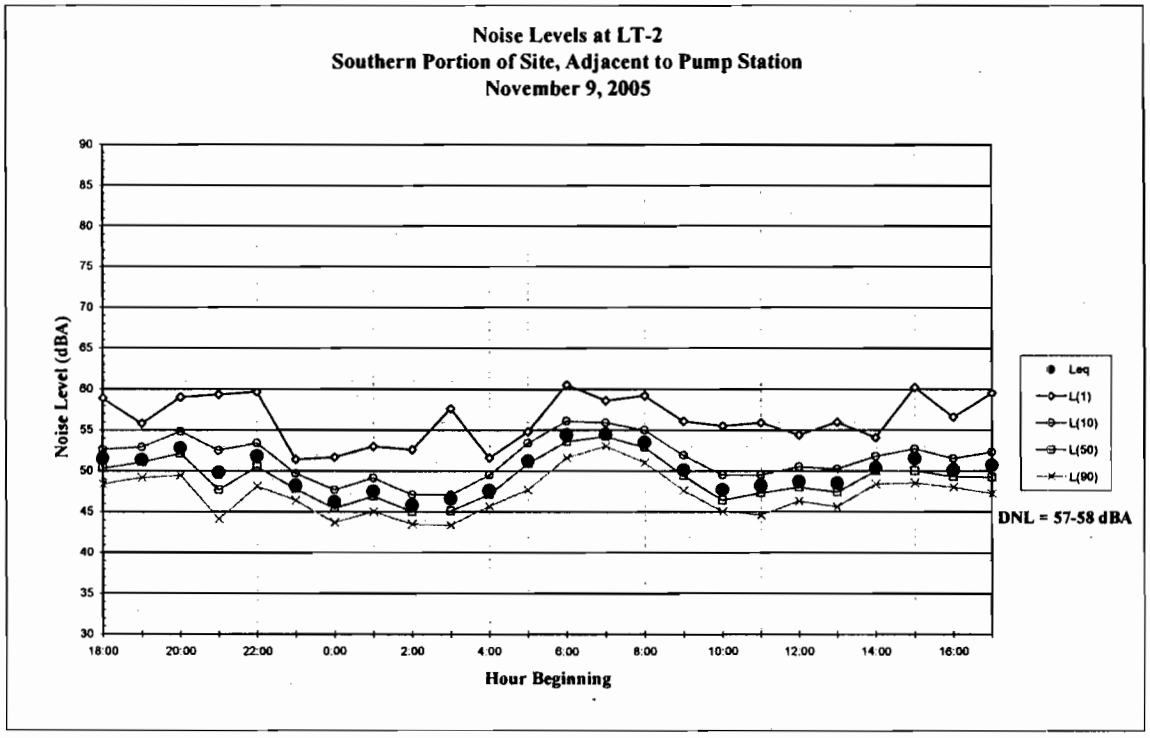
Noise measurement LT-1 was made adjacent to the City of Milpitas Storm Pump Station. Hourly average noise levels at this location ranged from 48 to 58 dBA L_{eq}, generated primarily by occasional traffic along Technology Drive and distant traffic noise. Aircraft generated instantaneous maximum noise levels of 50 to 55 dBA. Equipment at the pump station generated a noise level of about 62 dBA at this location during operation. The DNL noise level at this location is estimated to be 58 dBA. The trend in noise levels over the measurement period, which did not include any pump noise, is shown in Figure 2.

Figure 2 – Daily Trend in Noise Levels at LT-1



Measurement location LT-2 was located south of the project site, adjacent to the City and County of San Francisco Pump Station and to the Prudential Insurance parking lot. Hourly noise levels were typically 46 to 56 dBA L_{eq}. Local noise interference (such as an activity occurring very close to the measurement equipment) occurred during some measurement intervals, which raised hourly noise levels substantially, but would not be indicative of typical noise levels at this location. The DNL noise level at this location is estimated to be 57 to 58 dBA. Noise generated by the adjacent pump station was not distinguishable during the measurement location. The trend in noise levels over a 24-hour portion of the measurement period, which excluded extraneous interference, is shown in Figure 3.

Figure 3 – Daily Trend in Noise Levels at LT-2



NOISE IMPACTS AND MITIGATION MEASURES

Impact 1: **Noise and Land Use Compatibility.** Noise levels throughout the project site would meet the "normally acceptable" standard for multi-family residential land uses. **This is a *less-than-significant* impact.**

Exterior Noise Levels

The primary noise sources at the project site are distant and local traffic. Based on traffic data provided by Hexagon Transportation Consultants, Inc., future traffic noise levels would be about 62 dBA DNL at a distance of about 50 feet from the center of Murphy Ranch Road. The City of Milpitas Storm Pump Station is calculated to generate a noise level of 50 dBA at the project site property line during equipment operation. The Noise levels throughout the site would be below 65 dBA DNL and would meet the "normally acceptable" standard for multi-family land uses as specified by the City of Milpitas. This is a *less-than-significant* impact.

Interior Noise Levels
Interior average noise levels in new residential development must be maintained at or below 45 dBA DNL per the noise standard established by the State Building Code and the City of Milpitas. Interior noise levels are typically reduced by about 15 dBA inside homes with windows partially open and by about 20 to 25 dBA inside homes with windows closed, assuming standard California construction methods. Interior noise levels in residences located in noise environments of 60 dBA DNL or less can typically be maintained below standards (45 dBA DNL) with standard construction methods only. Where exterior day-night average noise levels are 60 to 70 dBA DNL, interior noise levels can typically be maintained below standards with the incorporation of an adequate forced air mechanical ventilation systems in the residential unit to allow residents the option of controlling noise by maintaining the windows closed.

Based on the site plan[1], residential buildings would be located at a setback of about 50 feet from the centerline of Murphy Ranch Road. At this distance, exterior traffic noise levels are anticipated to be about 62 dBA DNL in the future and interior noise levels could potentially exceed 45 dBA DNL if mitigation is not included in the design of these residences. At distances of 75 feet and further from the centerline of Murphy Ranch Road, exterior noise levels would be below 60 dBA DNL.

Mitigation 1: Residences located within 75 feet of the centerline of Murphy Ranch Road should be equipped with forced-air mechanical ventilation satisfactory to the City of Milpitas Building Department to allow the occupants the option of maintaining the windows closed to control noise.

Impact 2: **Project Operations.** Project generated traffic would not measurably change the existing noise environment at nearby noise sensitive uses. **This impact is *less-than-significant.***

Based on the data contained in the traffic study conducted for the project[2], traffic noise levels would increase as a result of the project and other growth in the area. However, the project would not result in substantial traffic noise increases or substantially contribute to any cumulative noise increases at any nearby noise sensitive uses (increases or contribution to increases are calculated to be less than 1 dB). Cumulative project traffic (which includes background and existing traffic volumes) would result in traffic noise increases of 3 to 4 dB along Murphy Ranch Road between Technology Drive and McCarthy Boulevard and traffic noise increases of 2 to 3 dB along Technology Drive between Murphy Ranch Road and McCarthy Boulevard, the majority of which is a result of project traffic. However, there are no existing noise-sensitive uses along these roadways. This is a *less-than-significant* impact.

Mitigation 2: None Recommended.

Impact 3: **Construction.** The construction of the project would temporarily increase noise levels in the immediate vicinity of the project site, but would not typically be audible at noise sensitive locations, which are located more than 700 feet from the project site. With appropriate construction time limits and noise suppression techniques, the noise generated by the construction activity would not generate significant adverse impacts. **With the incorporation of standard construction noise control measures, the impact would be considered *less-than-significant.***

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[1] Site Plan Murphy Ranch, Carlson, Barbee, & Gibson, Inc., July 8, 2005.

[2] Murphy Ranch Road Residential, Traffic Impact Analysis, Hexagon Transportation Consultants, Inc., April 25, 2006.

Project construction activities would take place in a period of about one year and would include grading of the site, paving of roadways, construction of project infrastructure, and construction of individual buildings. The highest noise levels would be generated during grading of the site, with lower noise levels occurring during building construction. Large pieces of earth-moving equipment, such as graders and bulldozers, typically generate maximum noise levels of 80 to 85 dBA at a distance of 100 feet. Typical hourly average construction-generated noise levels are about 75 to 80 dBA L_{eq} measured at a distance of 100 feet from the site during busy construction periods. These noise levels drop off at a rate of about 6 dBA per doubling of distance between the noise source and receptor.

The closest noise-sensitive uses (residences) are located to the east across Highway 880, to the south near Montague Expressway, and to the west of Zanker Road, all more than 700 feet from the project site. At this distance and with the shielding provided by the surrounding terrain, construction noise levels would not typically be audible at these residences. With the implementation of the following standard noise control measures, this would be a *less-than-significant* impact:

- Limit construction to daytime hours (7:00 AM to 7:00 PM) with no construction activities on Sundays or holidays.

- Use available noise suppression devices and properly maintain and muffle loud construction equipment.

- Designate a "noise disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and institute reasonable measures warranted to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site.

Mitigation 3: None Recommended.